

WHAT IS CLAIMED IS:

1. A method for automatic concatenation detection of synchronous optical network (SONET) channels, comprising:

5 receiving at a network element a SONET frame including a mandatory overhead and a plurality of channels for a bundled connection;

automatically determining a signal configuration of the channels within the bundled connection based on the
10 mandatory overhead; and

automatically provisioning the network element to cross-connect the channels within the bundled connection based on the signal configuration determined from the mandatory overhead.

15 2. The method of Claim 1, wherein the mandatory overhead comprises a line overhead.

3. The method of Claim 2, wherein the line
20 overhead comprises a synchronous transport signal (STS) payload pointer including concatenation indicators, further comprising automatically determining the signal configuration of the channels in the bundled connection based on the concatenation indicators.

25 4. The method of Claim 1, wherein the channels comprise synchronous transport signal-level 1 (STS-1) channels.

5. The method of Claim 1, wherein the network element includes a switch with cross-connections provisioned in a switching table, further comprising automatically provisioning the network element to cross-
5 connect the channels in the bundled connection by provisioning the switching table in the switch.

6. The method of Claim 1, further comprising:
extracting the mandatory overhead from the
10 SONET frame;
forwarding the mandatory overhead to a management complex in the network element;
determining at the management complex a signal configuration of the channels in the bundled connection
15 based on the mandatory overhead extracted from the SONET frame; and
provisioning a switch in the network element to cross-connect the channels in the bundled connection based on the signal configuration determined from the
20 mandatory overhead.

7. The method of Claim 1, further comprising:
determining the signal configuration comprises
a new signal configuration for the bundled connection;
25 and
automatically reprovisioning the network element to cross-connect the channels in the bundled connection based on the new signal configuration.

8. The method of Claim 7, further comprising
determining the signal configuration is the new signal
configuration in response to at least detecting the new
signal configuration for a predetermined number of
5 sampled SONET frames.

9. The method of Claim 8, wherein the number of
sampled SONET frames comprises at least three.

10 10. The method of Claim 1, wherein the signal
configuration comprises a plurality of connections in the
bundled connection.

11. A system for automatic concatenation detection of synchronous optical network (SONET) channels, comprising:

logic encoded in media; and

5 the logic operable upon execution to receive at a network element a SONET frame including a mandatory overhead and a plurality of channels for a bundled connection, to automatically determine a signal configuration of the channels in the bundled connection
10 based on the mandatory overhead and to automatically provision the network element to cross-connect the channels in the bundled connection based on the signal configuration determined from the mandatory overhead.

12. The system of Claim 11, wherein the mandatory overhead comprises a line overhead.

13. The system of Claim 12, wherein the line overhead comprises a synchronous transport signal (STS)
20 payload pointer including concatenation indicators, the logic further operable to automatically determine the signal configuration of the channels in the bundled connection based on the concatenation indicators.

14. The system of Claim 11, wherein the channels comprise synchronous transport signal - level 1 (STS-1) channels.

15. The system of Claim 11, wherein the network
30 element includes a switch with cross-connections provisioned in a switching table, the logic further operable to automatically provision the network element

to cross-connect the channels in the bundled connection by provisioning the switching table in the switch.

16. The system of Claim 11, the logic further
5 operable to extract the mandatory overhead from the SONET frame, to forward the mandatory overhead to a management complex in the network element, to determine at the management complex a signal configuration of the channels in the bundled connection based on the mandatory overhead
10 extracted from the SONET frame and to provision a switch in the network element to cross-connect the channels in the bundled connection based on the signal configuration determined from the mandatory overhead.

17. The system of Claim 11, the logic further
15 operable to determine the signal configuration comprises a new signal configuration for the bundled connection and to automatically reprovision the network element to cross-connect the channels in the bundled connection
20 based on the new signal configuration.

18. The system of Claim 17, the logic further
operable to determine the signal configuration is a new
signal configuration and response to at least detecting
25 the new signal configuration for a predetermined number of sampled SONET frames.

19. The system of Claim 18, wherein the number of
sample SONET frames comprises at least three.

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20. The system of Claim 11, wherein the signal configuration comprises a plurality of connections in the bundled connection.

21. A communications network, comprising:
a plurality of synchronous optical network (SONET) elements interconnected by fiber optic links; and
each of the SONET elements operable to
5 automatically provision cross-connections for a group of
associated channels based on line overhead information
transmitted in the channels.

22. A method for provisioning cross-connections in a synchronous optical network (SONET) network, comprising:

5 assigning a plurality of consecutive SONET synchronous transport signal (STS) channels to a customer without specifying a traffic mix of the channels;

automatically detecting based on a line overhead the traffic mix of the SONET STS channels at each network element along a transmission path in the
10 SONET network; and

each network element automatically provisioning its own cross-connects for the SONET STS channels based on the traffic mix detected from the line overhead.

15 23. The method of Claim 22, wherein the traffic mix is detected based on synchronous transport signal (STS) payload pointer bytes of the line overhead.

20 24. The method of Claim 23, wherein the traffic mix is detected based on concatenation indicators in the STS payload pointer bytes.

25. A method for automatic concatenation of synchronous optical network (SONET) channels, comprising:

receiving at a network element a SONET frame including a group of consecutive SONET synchronous transport signal (STS) channels assigned to a customer and an overhead of the SONET frame, the overhead including a line overhead having an STS payload pointer with concatenation indicators;

5 automatically determining at the network element a signal configuration of the SONET STS channels for the customer based on the concatenation indicators; and

10 automatically provisioning a switch of the network element to cross-connect the SONET STS channels of the customers based on the signal configuration determined from the concatenation indicators.